SUCRAGEL® XL RESULTS WITH DIFFERENT OILS

Charlotte Dredge

April 2024 – July 2024

Alchemy Ingredients,
4 Queens Square, Ascot Business Park, Lyndhurst Road, Ascot, SL5 9FE, UK
t. **+44 (0)1344 397 785** e. **technical@alchemy-ingredients.com**
Registered in England & Wales No. 10626359

Study Brief

This study aims to test Sucragel® XL and its compatibility with a range of different oils. This involves stability and viscosity testing to see how different oils change the appearance, texture and viscosity of the gels.

Experimental Details

Table 1: Framework formulation for all samples.

Phase	Ingredient	%
A	Sucragel® XL	20
B	Oil	80

Method: Measure out phase A and phase B in separate beakers. Start the propeller head at roughly 600RPM and slowly add phase B dropwise to phase A. The speed of addition can be increased to small portions after the first 10% of oil has been added, allowing the gel to recover between each addition, continue until all of phase B has been incorporated. The mixing speed can also be increased over time up to 900RPM as the formulation thickens.

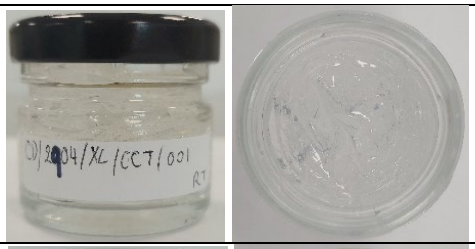
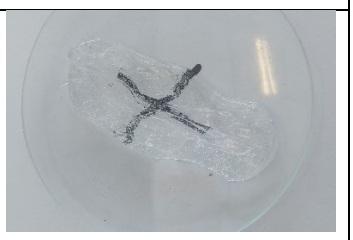
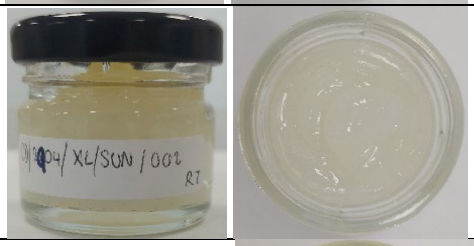
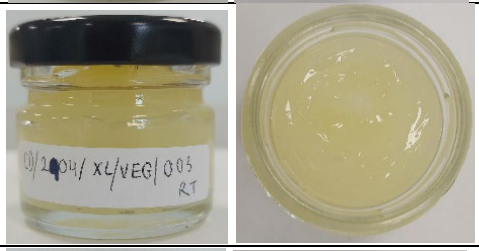
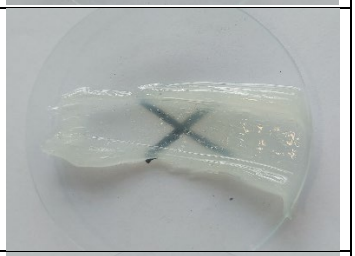
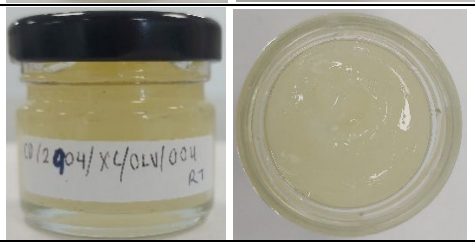
Table 2: All oils tested and their respective codes.

Oil Name	INCI Name	Sample Code Used
CCT	Caprylic/Capric Triglyceride	CD/2904/XL/CCT/001
Sunflower Oil	Helianthus Annuus Seed Oil	CD/2904/XL/SUN/002
Rapeseed Oil	Brassica Campestris Seed Oil	CD/2904/XL/VEG/003
Olive Oil	Olea Europaea Fruit Oil	CD/2904/XL/OLV/004
Sweet Almond Oil	Prunus Amygdalus Dulcis Oil	CD/2904/XL/ALM/005
Olive Squalane	Squalane	CD/2904/XL/SQU/006
IPM	Isopropyl Myristate	CD/2904/XL/IPM/007
Hemp Seed Oil	Cannabis Sativa Seed Oil	CD/3004/XL/HEMP/008
Grape Seed Oil	Vitis Vinifera Seed Oil	CD/3004/XL/GRAPE/009
Avocado Oil	Persea Gratissima Oil	CD/3004/XL/AVO/010
Rice Bran Oil	Oryza Sativa Bran Oil	CD/3004/XL/RICE/011
Jojoba Oil	Simmondsia Chinensis Seed Oil	CD/3004/XL/JOJO/012

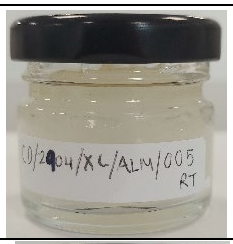
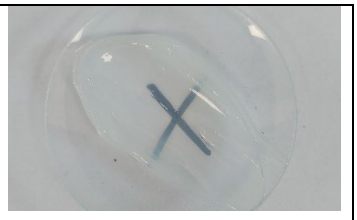
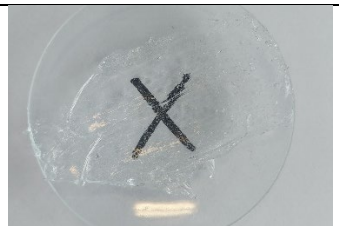
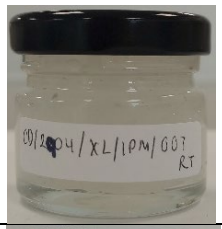
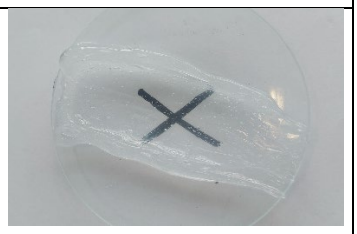
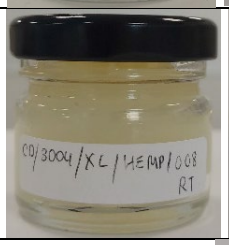
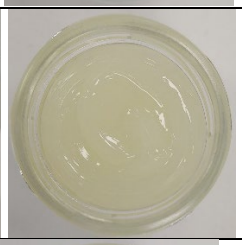
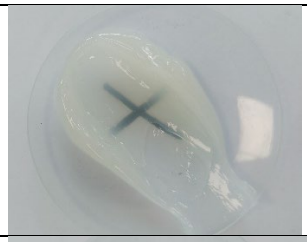
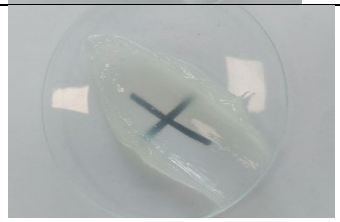
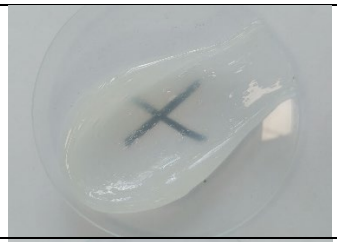
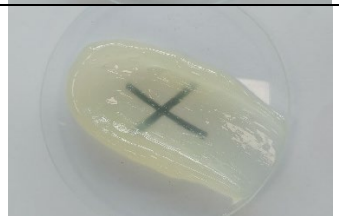
Coco-Caprylate/Caprate	Coco-Caprylate/Caprate	CD/3004/XL/COCO/013
Dicaprylyl Ether	Dicaprylyl Ether	CD/3004/XL/CET/014
Isostearyl Stearate	Isostearyl Isostearate	CD/3004/XL/ISO/015
Argan Oil	Argania Spinosa Kernel Oil	CD/3004/XL/ARG/016

Results

Table 3: Initial viscosities and images of all samples

Code	Initial Viscosity (cps)	Initial Images	Clarity
CD/2904/XL/CCT/001	102,600		
CD/2904/XL/SUN/002	90,800		
CD/2904/XL/VEG/003	56,200		
CD/2904/XL/OLV/004	57,600		

Alchemy Ingredients,
4 Queens Square, Ascot Business Park, Lyndhurst Road, Ascot, SL5 9FE, UK
t. **+44 (0)1344 397 785** e. **technical@alchemy-ingredients.com**
Registered in England & Wales No. 10626359

CD/2904/XL/ ALM/005	58,200			
CD/2904/XL/ SQU/006	84,600			
CD/2904/XL/I PM/007	39,000			
CD/3004/XL/ HEMP/008	78,000			
CD/3004/XL/ GRAPE/009	91,200			
CD/3004/XL/ AVO/010	67,200			
CD/3004/XL/ RICE/011	83,200			

Alchemy Ingredients,
4 Queens Square, Ascot Business Park, Lyndhurst Road, Ascot, SL5 9FE, UK
t. **+44 (0)1344 397 785** e. **technical@alchemy-ingredients.com**
Registered in England & Wales No. 10626359

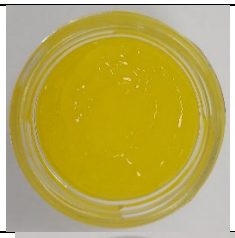
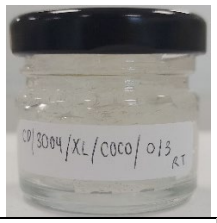
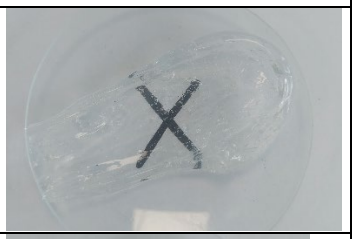
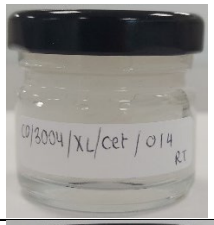
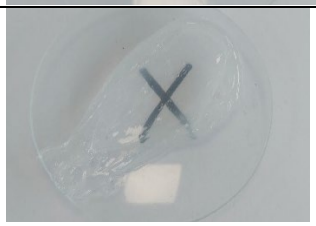
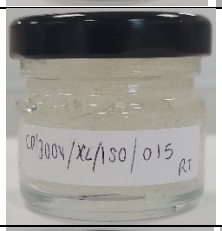
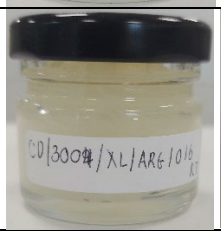
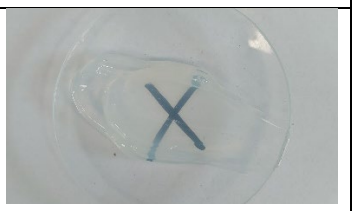
CD/3004/XL/JOJO/012	65,200			
CD/3004/XL/COCO/013	74,400			
CD/3004/XL/CET/014	48,400			
CD/3004/XL/ISO/015	56,000			
CD/3004/XL/ARG/016	114,400			

Table 4: Viscosities of samples after being on stability for three weeks.

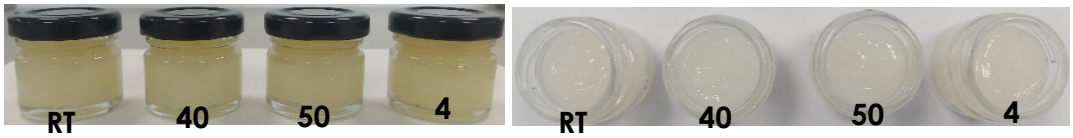
Code	**Room Temperature**	**40°C**	**50°C**	**4°C**
CD/2904/XL/CCT/001	94,600	78,000	66,400	90,200
CD/2904/XL/SUN/002	85,800	76,200	78,400	83,600
CD/2904/XL/VEG/003	56,800	58,000	57,400	65,200
CD/2904/XL/OLV/004	56,800	54,000	45,200	56,600
CD/2904/XL/ALM/005	58,200	56,400	54,200	66,000
CD/2904/XL/SQU/006	78,000	67,800	94,000	116,600
CD/2904/XL/IPM/007	36,000	33,800	23,400	39,200
CD/3004/XL/HEMP/008	75,200	63,200	60,200	85,000

CD/3004/XL/GRAPE/009	89,600	66,600	63,400	78,400
CD/3004/XL/AVO/010	68,000	74,800	54,200	62,200
CD/3004/XL/RICE/011	83,400	72,600	58,400	79,000
CD/3004/XL/JOJO/012	67,000	76,600	44,200	77,800
CD/3004/XL/COCO/013	72,200	78,400	56,200	88,200
CD/3004/XL/CET/014	45,000	32,800	18,800	65,000
CD/3004/XL/ISO/015	56,000	56,200	55,000	55,000
CD/3004/XL/ARG/016	97,800	94,200	95,600	98,600

Images of all samples after three weeks on stability:

CCT

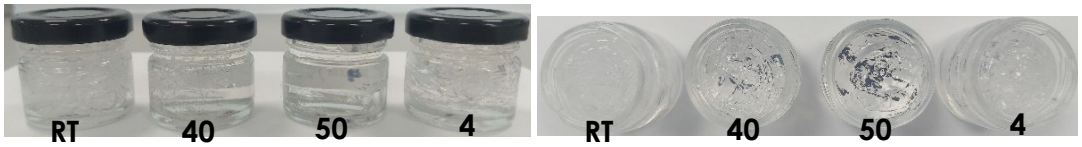
Sunflower



Vegetable

Olive

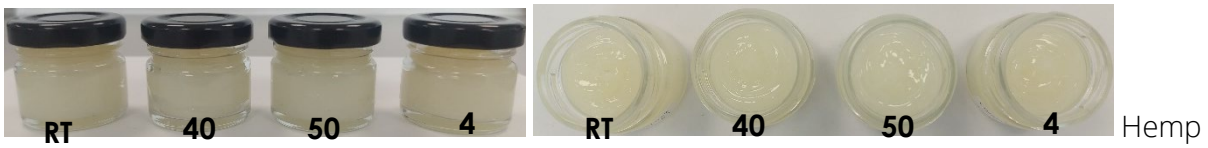
Almond



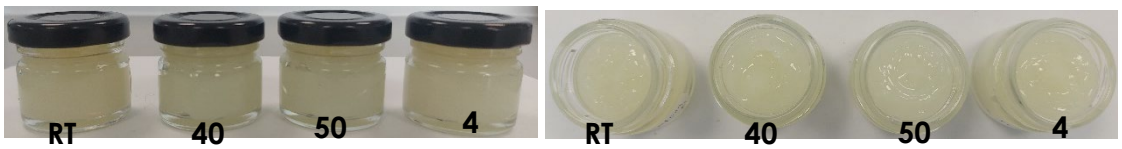
Squalane

IPM

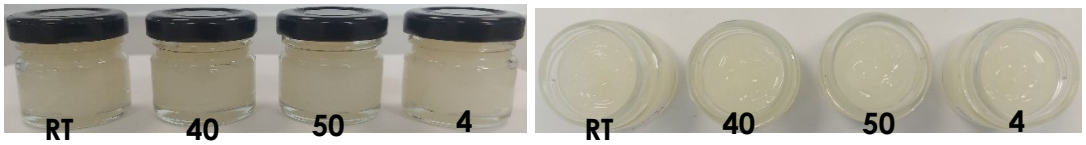
Alchemy Ingredients,
4 Queens Square, Ascot Business Park, Lyndhurst Road, Ascot, SL5 9FE, UK
t. **+44 (0)1344 397 785** e. **technical@alchemy-ingredients.com**
Registered in England & Wales No. 10626359



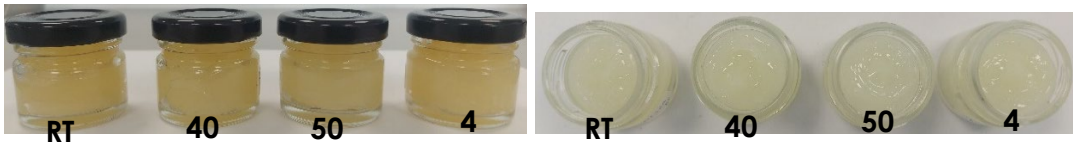
Hemp



Grape



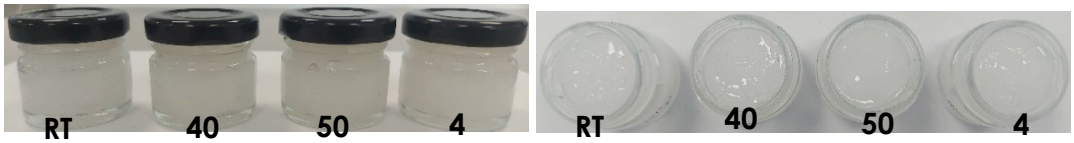
Avocado



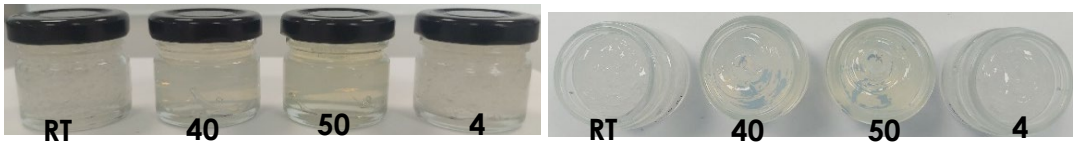
Rice Bran

Jojoba

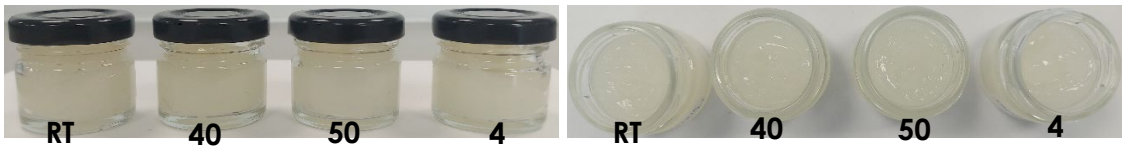
Coco/Caprylate



Dicaprylyl



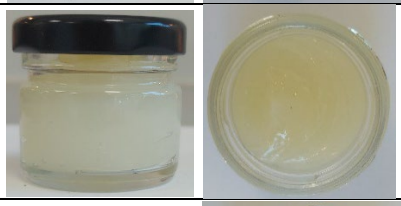
Isostearyl

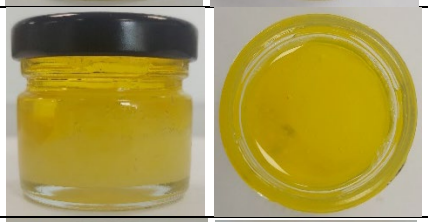
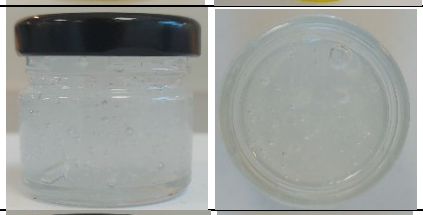


Argan

Alchemy Ingredients,
4 Queens Square, Ascot Business Park, Lyndhurst Road, Ascot, SL5 9FE, UK
t. **+44 (0)1344 397 785** e. **technical@alchemy-ingredients.com**
Registered in England & Wales No. 10626359

Table 5: Viscosities and images after six cycles of freeze thaw testing.

Code	Viscosity (cps)	Stability	Initial Images
CD/2904/XL/CCT/001	43,100	Stable	
CD/2904/XL/SUN/002	49,900	Stable	
CD/2904/XL/VEG/003	29,400	Stable	
CD/2904/XL/OLV/004	23,600	Stable	
CD/2904/XL/ALM/005	28,300	Stable	
CD/2904/XL/SQU/006	37,500	Stable	
CD/2904/XL/IPM/007	/	Failed after three cycles.	

CD/3004/XL/HEMP/008	38,400	Stable	
CD/3004/XL/GRAPE/009	37,700	Stable	
CD/3004/XL/AVO/010	32,000	Stable	
CD/3004/XL/RICE/011	/	Failed after two cycles.	
CD/3004/XL/JOJO/012	/	Failed after one cycle.	
CD/3004/XL/COCO/013	10,600	Viscosity has drastic drop.	
CD/3004/XL/CET/014	21,900	Stable	
CD/3004/XL/ISO/015	25,900	Stable	

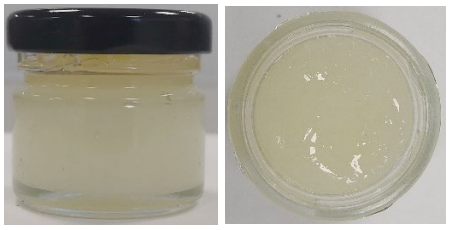
Alchemy Ingredients,
4 Queens Square, Ascot Business Park, Lyndhurst Road, Ascot, SL5 9FE, UK
t. **+44 (0)1344 397 785** e. **technical@alchemy-ingredients.com**
Registered in England & Wales No. 10626359

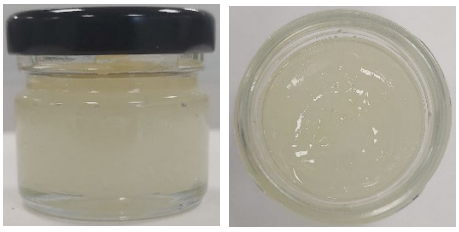
CD/3004/XL/ARG/016	46,700	Stable	

Images of all samples after three weeks of light testing:


CCT


Sunflower

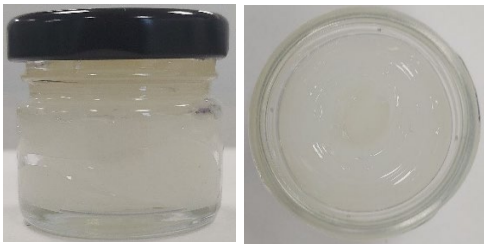

Vegetable

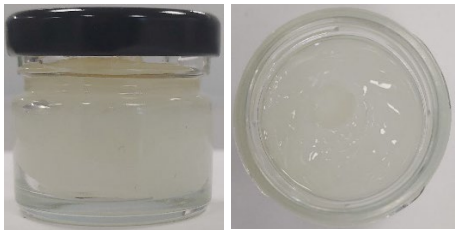

Olive

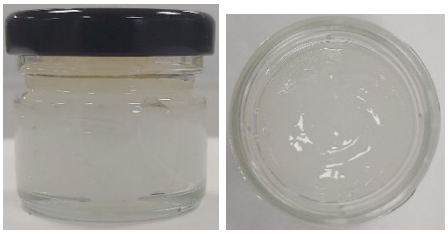

Almond


Squalane

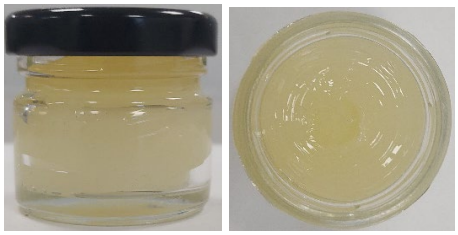

IPM


Hemp


Grape


Avocado

Alchemy Ingredients,
4 Queens Square, Ascot Business Park, Lyndhurst Road, Ascot, SL5 9FE, UK
t. **+44 (0)1344 397 785** e. **technical@alchemy-ingredients.com**
Registered in England & Wales No. 10626359

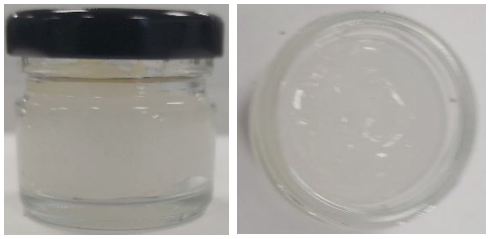

Rice Bran


Jojoba


Coco/Caprylate


Dicaprylyl


Isostearyl


Argan

Conclusions

All the samples passed stability at 50°C for three weeks with no oil seeping oil or separating. The viscosity of some of the samples do decrease overtime at 50°C however, they were consistent at room temperature therefore it could just be the elevated temperature causing the viscosity to decrease rather than stability over the long term.

Overall, the clarity of all the samples was very good and the 'X' on the paper beneath the sample was visible for all the oils. When comparing all the samples, the esters do have better clarity compared to the vegetable oils.

Twelve out of the sixteen samples passed freeze thaw testing. Jojoba oil is a liquid wax which is made of a large range of fatty acids, rice bran oil is also typically a wax which consists of esters based on fatty acids. When going through freeze thaw cycles these wax components will solidify and then compete with the gel network that Sucragel® XL creates, therefore causing the separation. Coco-caprylate/caprate and IPM both have low densities therefore the volume of liquid added to the system it larger than that of a typical oil. This larger oil phase then contributes to the separation of the gels during freeze thaw.

All these results are only true for these oils being used as the only ingredient in phase B. Due to previous testing when making prototypes using a blend of different oils, the stability can change depending on the blend of oils being used and the levels of each individual oil.

Alchemy Ingredients,
4 Queens Square, Ascot Business Park, Lyndhurst Road, Ascot, SL5 9FE, UK
t. **+44 (0)1344 397 785** e. **technical@alchemy-ingredients.com**
Registered in England & Wales No. 10626359

Light testing, and stability testing at 40°C, 4°C and room temperature will be continued until three months is complete, but the results are currently promising.

Report Compiled By: Charlotte Dredge

Position: Development Chemist

Date: 08/07/2024

Alchemy Ingredients,
4 Queens Square, Ascot Business Park, Lyndhurst Road, Ascot, SL5 9FE, UK
t. **+44 (0)1344 397 785** e. **technical@alchemy-ingredients.com**
Registered in England & Wales No. 10626359